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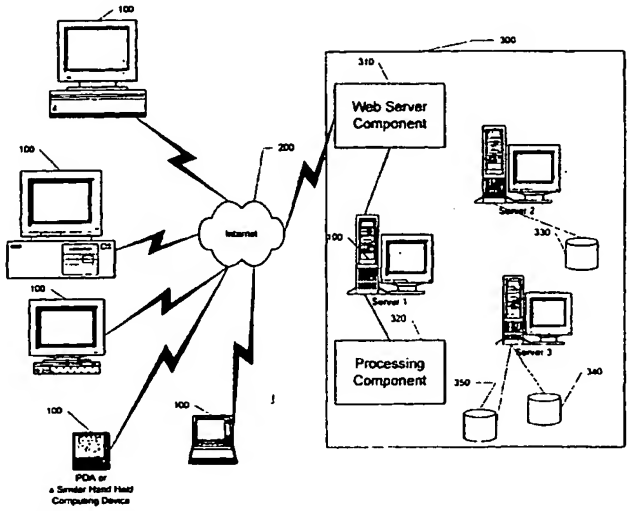

(57) Abstract: A system and method for assisting a customer in choosing among commodities (see Fig. 5) based on preferences of the customer [100] that includes identifying at least one first parameter associated with a commodity; associated at least one value to the at least one first parameter; calculating an estimated cost of the commodity based on features of the commodity that are desired by the customer and the customer's usage characteristics; obtaining from the customer a preference weighting on at least one second parameter; calculating an effective cost by adjusting the estimated cost based on the preference weighting and the at least one value assigned to the parameters; and presenting a list of commodities to the customer containing at least the commodity with the lowest effective cost.

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SYSTEM AND METHOD FOR ASSISTING CUSTOMERS IN CHOOSING AMONG A SET OF COMMODITIES USING CUSTOMER PREFERENCES

RELATED APPLICATIONS

This application is related to U.S. utility application Serial No. 09/497,483, filed February 4, 2000 which is herein incorporated by reference in its entirety.

FIELD OF THE INVENTION

The present invention relates to the sale of commodities, such as products and services, and more particularly, to a system and method for assisting customers in choosing among a set of commodities using customer preferences.

DESCRIPTION OF THE RELATED ART

In current practice, the average customer has a difficult time sifting through the enormous number of options for commodities, such as products and services, in order to find the best selection. Moreover, the increasing number of vendors that sell similar products and/or services adds to the difficulty. For example, in one state alone, customers may face a choice between thousands of vendors with thousands of different plans for telecommunication, entertainment (cable/satellite), and power services. Continued deregulation is increasing the number of available choices, as well as customer confusion associated with the new choices. For example, as barriers to entry for local phone service and cable are reduced, competition between vendors for customers will further intensify as the number of competitors increases.

As a result of these numerous choices, customers face various challenges. First, customers lack perfect information and are unaware of available choices. Second, customers are barraged with cryptic, difficult to decipher information from vendors. The perpetual flood of new choices that are offered for the purpose of attracting new customers exacerbates this problem. Third, many customers do not make optimum choices from the deals offered by the various vendors because the customers do not understand the choices in general, the impact the choices may have, and the cost of the choices. Fourth, significant time investment is required for customers to find all of the information they need to compare offerings from different vendors. Usually, it takes more time and effort than the average customer wants to exert. Finally, customers feel that they are at the mercy of the large "monopolistic" merchants and service providers.

Additionally, vendors must contend with their own set of issues. Vendors spend significant amounts of money on educating customers, selling products, and offering service plans to customers. Vendors want to obtain new customers at a reasonable cost and minimize the impact of turnover on their business. For example, a telecommunication service provider may spend between $100-$350 to acquire each new customer; however, as competition increases, customer retention also is an important issue.

Many vendors rely on conducting their own internal research studies in order to better understand their potential target audience. The marketplace is changing so rapidly that it is difficult for vendors to keep pace. Vendors need to remain current with their customer base and anticipate new services and products based on the changing needs of the customer.

Several systems and methods have been developed over the years to solve the above problems, but these systems and methods have many disadvantages. For example, many merchants or third-party resellers have web sites that offer side-by-side comparisons of products and/or services. One disadvantage of such a web site is that the burden is on the customers to spend several hours to determine what is best based on their own subjective assessment of the value associated with the various options. Many web sites present only the "lowest cost" commodity, without considering customer preferences. If the product or service does not meet their needs, frustrated customers will either return the commodities or switch to different vendors.

Accordingly, an integrated system and method are needed to assist customers in selecting between various competing products and services based on the customers' preferences, as well as to assist vendors in obtaining and retaining customers.

SUMMARY OF THE INVENTION

Accordingly, the present invention is directed to a system and method that substantially obviate one or more of the problems due to limitations and disadvantages of the related art.

An object of the present invention is to provide a system and method for assisting the customer in finding the optimal package of products and/or services based on the customer's preferences. Customers determine preferences and the relative weight of the preferences, and the system and method of the present invention use this information to generate the optimal commodity options that best meet the expressed preferences of the

customers. As a result, customers save time and money and find the best product/service that meets their needs.

Another object of the present invention is to provide a system and method for assisting vendors that sell commodities in acquiring and retaining customers by directing customers to the commodities at a lower cost to the vendor.

Additional features and advantages of the invention will be set forth in the description, which follows, and will be apparent from the description, or may be learned by practice of the invention. The objects and other advantages of the invention will be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

To achieve these and other advantages in accordance with the purpose of the invention, as embodied and broadly described herein, the present invention provides a method for assisting a customer in choosing between commodities based on preferences of the customer that includes the steps of identifying at least one first parameter associated with a commodity; associating at least one value to the at least one first parameter; calculating an estimated cost of the commodity based on features of the commodity that are desired by the customer; obtaining from the customer a preference weighting on at least one second parameter; calculating an effective cost by adjusting the estimated cost based on the preference weighting and the at least one value assigned to the parameters; and presenting a list of commodities to the customer containing at least the commodity with the lowest effective cost.

In another aspect, the present invention provides a system for assisting a customer in choosing between commodities based on preferences of the customer that includes an optimizer device that is connected to a network, wherein the customer uses a customer device for connecting to the optimizer device via the network and sending preferences of the customer to the optimizer device, and wherein the optimizer device includes at least one database that contains information about at least one commodity, and at least one utility function, and a processing component for presenting to the customer a list of commodities containing at least one commodity based on the preferences and the utility function.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

In the drawings:

Fig. 1 is an overall system block diagram of a preferred embodiment of the present invention;

Fig. 2 is a block diagram illustrating the components of the customer device 100 shown in Fig. 1;

Fig. 3 is a block diagram illustrating the components of the optimizer device 300 shown in Fig. 1;

Fig. 4 is a block diagram illustrating an example of a system of the present invention;

Fig. 5 is a block diagram illustrating a second example of a system of the present invention;

Fig. 6 is a flow chart depicting one embodiment of an operation of the present invention;

Fig. 7 is a flow chart depicting the process of deriving the utility functions of the present invention;

Fig. 8 is a sample survey for use in calculating utility equations for an Internet Service Provider; and

Fig. 9 is a flow chart depicting the effective cost calculation of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

The present invention provides an integrated system and method to assist a customer in selecting among the various commodities based on customer preferences and to assist vendors in obtaining and retaining customers. In particular, the system of the present invention determines the optimal commodity choices for a customer based on values that the customer assigns to key features, attributes, or performance characteristics of the commodity that the customer is shopping for and the relative importance of those features, attributes, or performance characteristics to the customer. As a result, the present invention enables a customer to make a "best value" choice, rather than just selecting the "lowest cost" choice.

The system and method of the present invention are not limited to any particular product or service. The selection of any type of commodity, including but not limited to goods, products, services, and/or service plans, can be optimized by the system and method of the present invention. The commodity includes commodities that sell for money and/or commodities that are free.

The components of the system will be described now, followed by a description of the operation of the system.

With reference to Fig. 1, a preferred embodiment of the system in accordance with the present invention includes an optimizer device 300 that is connected to a network 200. A customer device 100 accesses the optimizer device 300 through the network 200. Network 200 may be any type of computer network, such as the Internet, an Intranet, or an Extranet, for example. Access devices, such as phone lines, cable lines, fiber optic cables, or wireless communication systems may be used to access the network 200. One or more

types of access devices may be used to connect to the network 200. For example, the customer device 100 may access the network 200 using a wireless communication system, whereas the optimizer device 300 may access the network 200 using fiber optic cables. This and other networks and access device configurations will be known to those skilled in the art, and are within the scope of this invention. The structure of the customer device 100 and the optimizer device 300 will be described next.

Customers in the system of the present invention may include, but are not limited to, consumers, businesses, or government entities. The customer device 100 is used by a customer to access the network 200. The customer device 100 may be a personal computer, a handheld computer or any similar device known to those skilled in the art. As shown in Fig. 2, the customer device 100 may include a browser 110, such as a world wide web browser; other software and data storage 120; at least one input device 130, such as a keyboard or a mouse; at least one communications device 140, such as a modem; at least one processor 150; memory 160, and at least one output device 170, such as a monitor; all of which may communicate with each other, for example, via a communication bus 180. The memory 160 may be Random Access Memory (RAM), Read Only Memory (ROM), or both. Other customer devices and their components will be known to those skilled in the art, and are within the scope of the present invention.

The optimizer device 300 shown in Fig. 1 will be described now. As shown in Fig. 3, the optimizer device 300 may include a web server component 310, a processing component 320, a customer database 330, a commodity database 340, and an optimization database 350. The optimizer device 300 also may include at least one administrative

interface for administering the various components. Other devices and their components will be known to those skilled in the art, and are within the scope of the present invention. Some of the components shown in Fig. 3 will be described in detail along with the description of the system's operation.

Each of the components of the optimizer device 300 will be described now. The web server component 310 may be used to host a web site. The processing component 320 may include optimization and database interaction routines. The web server component 310 and the processing component 320 may be used to obtain information from the customer, such as name and preferences, which is then stored in the customer database 330.

The commodity database 340 stores information on the vendors and commodities. Vendors in the present invention may include, but are not limited to, merchants, service providers, government entities, and non-profit organizations. Vendors may either sell the commodities or provide these commodities free. The administrative interface may be used to enter information about these vendors and their commodities into the commodity database 340. The vendors and commodities may be indexed in the commodity database 340 by categorizing them into a category. For example, all vendors that sell automobiles may be categorized into a vehicle category. The commodity database 340 may include quality, features, and price information for a commodity. For example, if the commodity is an Internet Service Provider (ISP) plan, the commodity database may include information about ISPs such as geographic area indicating the area where the ISP provides service, monthly cost, usage cost per hour, equipment cost, connection speed, disk space,

number of email accounts, quality rating, contract length, and termination fee. The quality rating may be a third party rating or a rating based on previously collected samples of customer responses to questions asked on the web site.

The optimization database 350 stores utility functions, constants, supporting statistics, and other optimization equations. The utility function may be an equation for calculating a quantitative value, such as a dollar value, that a customer assigns to the key parameters of a commodity. Key parameters may include, but are not limited to, features, attributes, or performance characteristics of a commodity. For example, in the case of an ISP, the optimization database 350 may contain utility functions for calculating the value that the customer assigns to connection speed, amount of disk space, quality of the service provider, number of email accounts, and service contract length and termination fees associated with early termination. The utility functions are evaluated to obtain values that quantitatively represent a cost or benefit of the key parameters to the customer.

The optimization database 350 also stores other optimization equations, such as estimated cost equations and effective cost equations. Estimated cost equations represent the cost of a commodity to a customer based on the customer's requirements or usage. For example, in the case of an ISP, the estimated cost equation is based on usage of the Internet service and will be explained with the description of the operation of the system. The estimated cost equation may also include other costs, such as online billing costs if the customer requests online billing. Effective cost equations, on the other hand, include the values obtained from evaluating the utility functions, estimated cost equations, and any other costs, such as amortization costs. If the utility function represents a benefit to the

customer, then the value is subtracted from the estimated cost. On the other hand, the value is added to the estimated cost if it represents a cost or burden to the customer. These equations and utility function will be explained in detail with the description of the operation of the system.

Two examples of how the system of the present invention may be implemented will be described now by referring to Figs. 4 and 5. As shown in Figs. 4 and 5, a customer may use a desktop or laptop computer as customer device 100. This computer may contain all the components shown in Fig. 2. At the other end, an application server may be used as the optimizer device 300. This server may include the web server component 310, processing component 320, customer database 330, commodity database 340, and optimization database 350. Optimizer device 300 and customer device 100 are connected to each other via the Network 200, such as the Internet. The customer may use the communications device 140 in his computer to connect to the Internet and access the web site hosted by the web server component 310 on the application server using the browser 110 and standard Internet protocols.

Fig. 5 shows a second implementation and is similar to Fig. 4 with the exception of the optimizer device 300. In Fig. 5, the optimizer device 300 consists of three servers, instead of one. Moreover, these three servers may be connected to each other, for example in a Local Area Network (LAN). More servers assist in load balancing and keep customers from getting frustrated. The web server component 310 may run on Server 1 and the other components of the optimizer device 300, such as the customer database 330, commodity database 340, and optimization database 350, may run on Servers 2 or 3.

Depending on the amount of traffic to the web site, more servers may be added if needed. The present invention is not limited to the above examples. Other implementation configurations will be known to those skilled in the art, and are within the scope of the present invention.

The operation of the system will be described now with reference to Figs. 6-9. In step 805 of Fig. 6, the customer uses the customer device 100 to visit the web site hosted by the web server component 310. For example, the customer may use the browser 110, such as Netscape Navigator, to visit the web site. Next, the customer selects the desired commodity category, as indicated by step 810. For example, if the customer desires to purchase a camera, the customer selects the camera category. Next, the customer is asked to enter account information, as indicated by step 815. If the customer is a new user to the system, the customer is asked to enter personal information, such as name, address, e-mail address, and a password for future visits to the site, as indicated by step 817. Once the customer provides this information, the system creates an account for the customer and the system presents the customer with questions relating to the selected commodity category, as indicated by step 820. Alternatively, if the customer already has an account with the system, the system asks the customer for a user name and password at step 819. The account information may be stored in the customer database 330. Other customer authentication schemes known to those skilled in the art may be used and are within the scope of the present invention.

Once the customer enters the correct user name and password, the system presents the customer with questions relating to the selected commodity category, as indicated by

step 820. The customer is presented with a set of questions relating to the commodity category that was selected by the customer in step 810. In particular, the system asks for the customer's hard requirements, preferences, and preference weightings. Hard requirements may include requirements that the customer absolutely needs in a commodity and/or geographic area information. For example, if the customer is shopping for a four-wheel drive vehicle, the customer may indicate that as a hard requirement. Preferences may include the customer's preferences about certain features of the commodity. Preference weightings may be the relative importance of these preferences against each other. For example, if the customer is shopping for a new ISP plan, the system may request the name and plan information of the customer's current service provider and a current estimated monthly bill. The system may also ask the customer to rate the current service provider. This rating may be used to calculate future quality ratings associated with an ISP. The system may also request the customer's estimated approximate usage per month, the current connection speed (CSref), the desired number of e-mail accounts (EMref), the desired amount of disk storage space (DSref), and the desired contract length (CLref). The system may also ask the customer for preference weightings for connection speed, disk storage space, number of e-mail accounts, quality, and price. Furthermore, the customer may be asked to weigh the importance in percentages. In an alternative embodiment, the customer may be forced to assign percentages so that the percentages add to a hundred percent. For example, a customer may enter his importance ratings as connection speed (30%), disk space (10%), number of e-mail accounts (10%), quality (20%) and price (30%). Additionally, the customer may choose to make connection speed,

disk storage space, number of e-mail accounts, quality, and/or price hard requirements. The geographic area is an automatic hard requirement in the case of an ISP because some ISPs only provide service in certain areas.

In an alternative embodiment, some of the required information, such as geographic location or preference information may be retrieved from the customer database 330. This retrieved information may be the information that the customer provided to the system during previous visits or during the account creation step. Moreover, the customer may be presented with this retrieved information and may be given the choice to amend this information rather than having to enter everything again.

Next, as shown in steps 840, 845, 850, and 855, the system queries the commodity database to find the eligible commodities that meet the customer's hard requirements that were entered in step 825. For example, if a customer is shopping for four-wheel drive vehicles, the system will query the commodity database for four-wheel drive vehicles. As another example, if a customer shopping for an ISP plan has a hard requirement of at least two e-mail accounts, only ISP plans serving the customer's geographic area and providing at least two e-mail accounts are considered by the system to be "eligible". Geographic area can be determined through Zipcodes, area codes and exchanges, or any other method known to those skilled in the art. If a particular commodity does not match the hard requirements, the commodity is discarded as a choice for the customer. Alternatively, if a particular commodity meets the customer's hard requirements, the system identifies the commodity as eligible.

As an example, consider a customer located in the 610 area code and 644 exchange area shopping for a new ISP plan. This customer requires that the ISP plan provide him with at least two e-mail accounts. Table 1 illustrates sample data from the commodity database before the query is executed. After executing the query, the optimizer will discard Plan 1, even though it is eligible geographically, because it does not offer at least two e-mail accounts. Plan 4 is discarded because it is not in the customer's geographic area. The shaded columns in Table 2 illustrate that these choices are ineligible.

ISP Option	Plan 1	Plan 2	Plan 3	Plan 4	Plan5
Area Code + Exchange	610-644	610-644	610-644	202-467	610-644
Monthly Cost	9.95	19.95	39.99	34.99	45.99
Usage Cost (Per hr)	0.50	0	0	0	0
Equipment Cost	0	0	120.00	59.00	79.99
Connection Speed	56	56	1000	1500	128
Disk Space	3	1	5	4	6
EMAIL Accounts	1	2	4	2	3
Quality Rating	2	4	3	4	5
Contract Length	0	0	6	12	6
Termination Fee	0	0	20.00	40.00	50.00

Table 1

ISP Option	Plan 1	Plan 2	Plan 3	Plan 4	Plan5
Area Code + Exchange	610-644	610-644	610-644	202-467	610-644
Monthly Cost	9.95	19.95	39.99	34.99	45.99
Usage Cost (Per hr)	0.50	0	0	0	0
Equipment Cost	0	0	120.00	59.00	79.99

Connection Speed	56	56	1000	1500	128
Disk Space	3	1	5	4	6
EMAIL Accounts	1	2	4	2	3
Quality Rating	2	4	3	4	5
Contract Length	0	0	6	12	6
Termination Fee	0	0	20.00	40.00	50.00

Table 2

Next, in steps 860 and 865, the system retrieves the estimated cost equations from the optimization database and calculates the estimated costs for all the eligible commodities. For example, in the case of the ISP plans, the effective cost calculation may be expressed in terms of the estimated monthly cost (EMC):

EMC = Monthly cost + Usage Cost * Estimated Usage.

In the equation above, the Monthly cost is the recurring monthly charge in dollars associated with a particular ISP plan; Usage Cost is the cost per time of use in dollars per hour, and Estimated Usage is the customer's estimate of the amount of time that will be spent using an ISP's services during a month.

For the three eligible plans listed in Table 2, the EMC can be calculated by using the estimated usage information that the customer entered in step 825 and by using the monthly cost and usage cost that were retrieved from the commodity database in step 865. Assuming that the customer entered 30 hours/month in step 825, the EMCs for the eligible plans listed in Table 2 are:

EMC (plan2)= $19.95

EMC (plan3)= $39.99

EMC (plan5)= $45.99

Next, the estimated cost is adjusted by the utility functions and other cost equations stored in the optimization database 350. The process of calculating the utility functions and associated constants will be described now with reference to Fig. 7. The process begins with the identification of the key parameters associated with a commodity category, as shown in step 610. These key parameters are parameters that affect the customer's decision about a commodity and may include features, performance, or quality characteristics of a particular commodity. For example, in the case of an ISP plan, the key parameters are connection speed; disk space (which the customer, for example, may use for a web site); the quality of the connection; number of e-mail accounts; and the contract length and the termination fee associated with such a plan. These parameters may be identified based on engineering judgment or may be based on a survey of random customers.

Next, in step 620, the range for each parameter is identified. For example, in the case of connection speed of an ISP plan, the range may be from less than 33kpbs to 1500kpbs. Once the ranges are identified, the utility functions may be calculated by using regression analysis, engineering judgement, or a combination of both, as shown in steps 630, 635, 640, 645, and 650. If regression analysis is used, a random set of customers may be sampled to obtain a quantitative value, usually a dollar value, associated with that particular parameter, as shown in step 635. For example, in the case of an ISP plan, a survey like the one shown in Fig. 8 may be sent to ISP customers. The dollar values may be then used to calculate a best-fit utility function via regression analysis, as shown in step

645. Alternatively, the utility function may be calculated using engineering judgment, or a combination of regression analysis and engineering judgment, as shown in step 640. For example, engineering judgement may be used to adjust the utility function obtained through regression analysis. If needed, steps 630, 635, 640, and 645 may be repeated to calculate the utility functions for all of the key parameters associated with each commodity, as shown in step 650. The utility functions may be calculated for a generalized sample group or for specific sample groups based on demographics, for example age, income, household size, and spending. Moreover, the spending may be based on the estimated costs.

For example, in the case of an ISP plan, there may be five key parameters as identified above, and thus, five utility functions. These five utility functions are:

a. U(connection speed) = Kcs*Pcs*ln(CS/CSref)

b. U(disk space) = Kds*Pds*ln(DS/DSref)

c. U(quality) = Kq*Pq*ln(Q/Qref)

d. U(email) = Kem*Pem*ln(EM/EMref)

e. U(termination fee/contract length) = Ktf*TF*(CL-CLref)/CL

if CL>CLref, otherwise = 0

In these five utility functions, Kcs, Kds, Kq, Kem, and Ktf are constants that will be described in step 665; Pcs, Pds, Pq, and Pem represent the preference weightings and will be described in step 665; CS, DS, Q, EM, and CL represent connection speed, disk space, quality, email, and termination fee, respectively, for a specific Internet Service Provider plan and are stored in the commodity database 340; CSref, DSref, Qref, EMref,

and CLref represent the values entered by the customer in step 825, or predefined, for example as average values (such as QRef). These values entered by the customer may be used to normalize the parameters, as shown in the utility functions above.

In step 655, an independence check is done on each utility function versus the other utility functions for a given commodity using correlation, which may include regressing against the other utility functions. If correlation is present, the redundant utility term is either omitted from the equation or an interaction term of the form K3*U1(x)*U2(x) is added to account for the relationship, as shown in step 660. After the independence check is completed, the constants for each utility function for which the customer provides a preference weighting, such as Kcs, Kds, Kq, and Kem, are calculated by dividing the original regression constants by the expected value of the preference weighting range, as shown in step 665. For example, in the case of an ISP plan, the original regression constants were 7.6 for connection speed, 0.9 for disk space, 3.64 for quality, 2.2 for e-mail, and 2.43 for termination fee/contract length. Moreover, the customer is asked to provide a preference weighting over a weighting range of zero to hundred for five parameters: price, quality, connection speed, disk space, and number of e-mail accounts. Thus, given equal importance of all parameters, the expected value of the preference weighting for each parameter is twenty. Accordingly, the constants, Kcs, Kds, Kq, and Kem, are calculated by dividing the original regression constants by twenty. Ktf is not adjusted since the customer does not input a preference weighting for the termination fee. Instead, the customer inputs the acceptable value of the contract length in months, which is used as the

reference contract length, CLref. Accordingly, in the ISP case, the constants are: Kcs = 0.38 , Kds = 0.045, Kq = 0.182, Kem = 0.11, and Ktf = 2.43.

Finally, the utility functions, along with the constants and the sample data used for regression analysis, are stored in the optimization database 350, as shown in step 670. Other methods of calculating utility functions will be known to those skilled in the art and are within the scope of the present invention.

As mentioned in the foregoing description, the estimated cost calculated in step 860 is adjusted by the values obtained from evaluating the utility functions that relate to the commodity that the customer desires to purchase. The value is subtracted from the estimated cost if it represents a benefit to the customer. On the other hand, the value is added to the estimated cost if it represents a cost or burden to the customer. Fig. 9 will be used to describe this adjustment process. In step 910, the utility functions and effective cost equations are retrieved from the optimization database 350. These equations are evaluated based on the customer inputs as indicated by branch A in step 920. For example, in the case of the ISP plan, the utility functions, U(connection speed), U(disk space), U(quality), U(email), and U(termination fee), are evaluated. The resulting utility function values and other related costs are added or subtracted from the estimated cost to get the effective cost. The effective cost equations, in most cases, represent the sum of the utility function values, estimated costs, and any other costs, such as amortized fixed costs. For example, the effective cost equation for an ISP is:

Effective Cost = EMC + Amortized fixed Costs – U(connection speed) - U(disk space)

- U(quality) – U(email) + U(termination fee).

The Amortized fixed costs are equal to (Activation Fee + Equipment Cost)/Contract Length (CL Ref). The amortized fixed costs and the value of the termination fee utility function are added to the Effective Cost because these represent a cost or burden to the customer, and the others are subtracted from the Effective Cost because they represent a benefit to the customer. Using the above equation, the effective costs for the eligible commodities are Plan 2 is $18.6, Plan 3 is $32.5, and Plan 5 is $48.4.

Once the effective cost is calculated, the commodities are ranked based on effective cost, as indicated by step 955. The highest ranked commodities are presented to the customer, as indicated by step 965. For example, Plan 2 will be the highest ranked plan in the ISP case. Next, the customer selects the commodity that the customer wants to purchase and the system processes the request, as indicated by step 965. Now, the customer has the option of either ending the session, such as by exiting the browser, or can repeat this process for another commodity category, as indicated by steps 970, 975, and branch C.

Although the present invention was described with an example of an ISP plan, the present invention is not limited for use with an ISP. A person skilled in the art will know how to modify the present invention for use with other products and/or services.

The present invention assists both customers and vendors. Customers obtain the commodity that best meets their personal preferences, while the vendors educate customers about their commodities. Moreover, customers who use the system of the present invention to select a vendor are likely to stay with this vendor because the

commodity selection and thus, the vendor selection, is based on the customer's preferences.

While the invention has been described in detail and with reference to specific embodiments thereof, it will be apparent to one skilled in the art that various changes and modifications can be made therein without departing from the spirit or scope thereof. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

WHAT IS CLAIMED IS:

1. A method for assisting a customer in choosing among commodities based on preferences of the customer, the method comprising the steps of:

identifying at least one first parameter associated with a commodity;

associating at least one value to the at least one first parameter;

calculating an estimated cost of the commodity based on features of the commodity that are desired by the customer;

obtaining from the customer a preference weighting on at least one second parameter;

calculating an effective cost by adjusting the estimated cost based on the preference weighting and the at least one value assigned to the parameters; and

presenting a list of commodities to the customer containing at least the commodity with the lowest effective cost.

2. The method of claim 1, wherein the step of associating at least one value to the at least one first parameter includes the steps of:

setting a range for the at least one first parameter;

sampling a random set of customers over the range; and

determining a best fit utility function using regression analysis on data received as a result of sampling.

3. The method of claim 1, wherein the step of assigning at least one value to the at least one first parameter includes the step of determining a utility function based on engineering judgment.

4. The method of claim 3, wherein the utility function is evaluated to obtain the at least one value, wherein the value represents a cost or benefit of the parameter to the customer.

5. The method of claim 4, wherein the value is subtracted from the estimated cost if the value represents a benefit to the customer or the value is added to the estimated cost if the value represents a cost to the customer.

6. The method of claim 4, further comprising the steps of:

visiting a web site by the customer;

sending the preferences of the customer to the web site; and

selecting at least one commodity from the list of commodities for purchase.

7. The method of claim 6, further comprising the step of adding an amortized fixed cost to the estimated cost.

8. The method of claim 1, wherein the step of identifying at least one first parameter associated with a commodity includes the step of identifying the parameter that affects a customer's decision.

9. The method of claim 4, wherein the utility function is stored in a first database, information about the commodity is stored in a second database, and information about the customer is stored in a third database.

10. The method of claim 1, wherein the commodity is selected from a group consisting of products and services.

11. The method of claim 1, wherein the parameter is a feature, an attribute, or a performance characteristic associated with the commodity.

12. The method of claim 1, wherein the at least one second parameter is the same as the at least one first parameter.

13. A system for assisting a customer in choosing between commodities based on preferences of the customer, comprising:

an optimizer device that is connected to a network; and

a customer device for connecting to the optimizer device via the network and sending preferences of the customer to the optimizer device,

wherein the optimizer device includes at least one database that contains information about at least one commodity, and at least one utility function, and a processing component for presenting to the customer a list of commodities containing at least one commodity based on the preferences and the utility function.

14. The system of claim 13, wherein the optimizer device includes a web server component for hosting a web site and the customer uses the customer device to visit the web site.

15. The system of claim 14, wherein the utility function is associated with a parameter of the commodity and is evaluated to obtain the at least one value, wherein the value represents a cost or benefit of the parameter to the customer.

16. The system of claim 15, wherein the preferences of the customer include the preference weighting of customer on at least one second parameter associated with the commodity.

17. The system of claim 16, wherein the at least one first parameter and at least one second parameter are the same.

Fig. 1

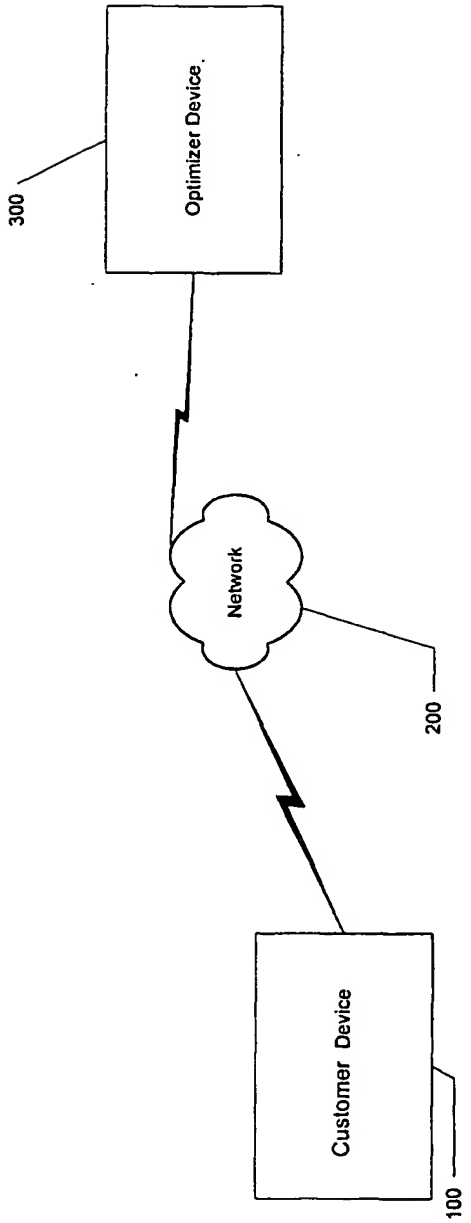


Fig. 2

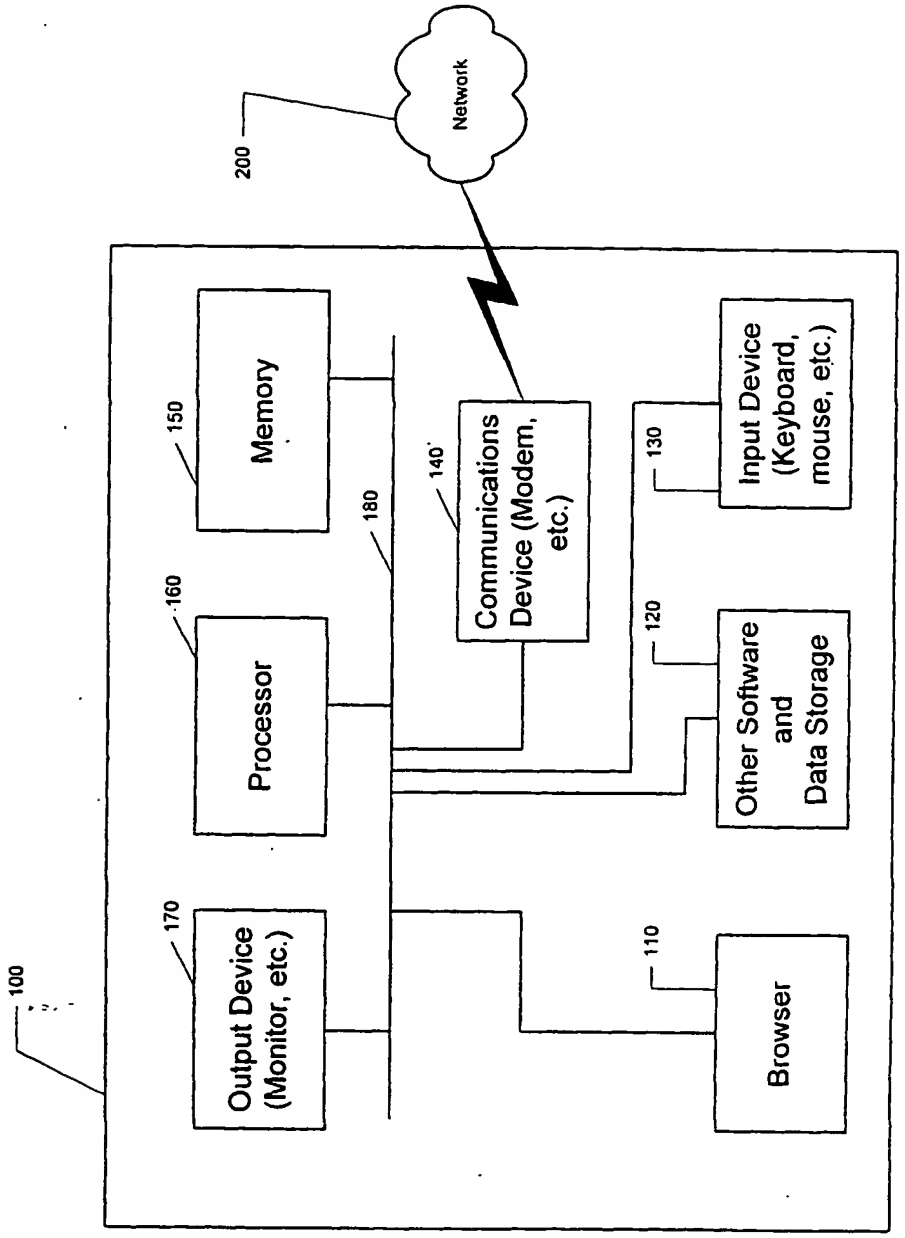
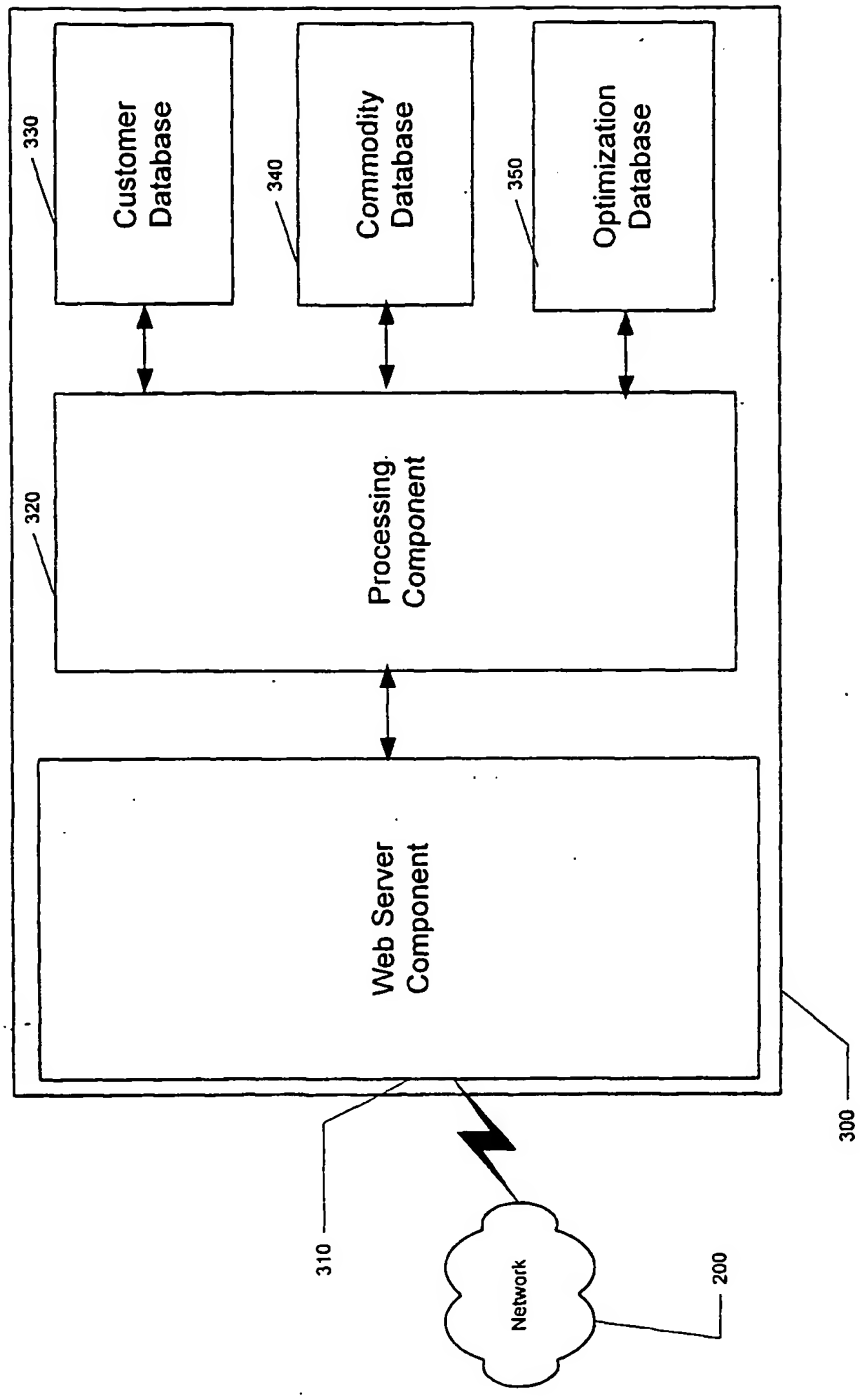

Network
200
100
Memory
150
Processor
160
Output Device (Monitor, etc.)
170
Communications Device (Modem, etc.)
140
180
Input Device (Keyboard, mouse, etc.)
130
Other Software and Data Storage
120
Browser
110

Fig. 3


Customer Database
330
Commodity Database
340
Optimization Database
350
Processing Component
320
Web Server Component
300
310
Network
200

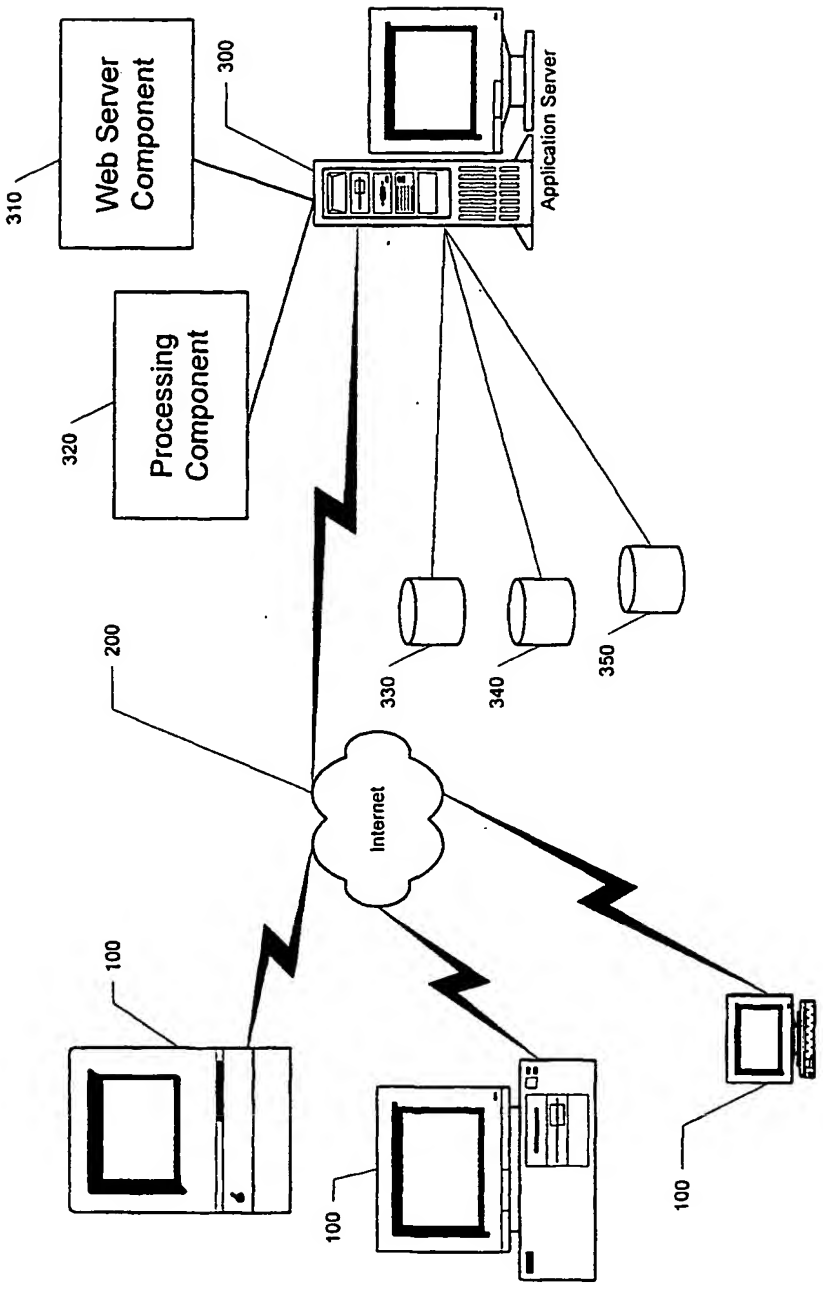
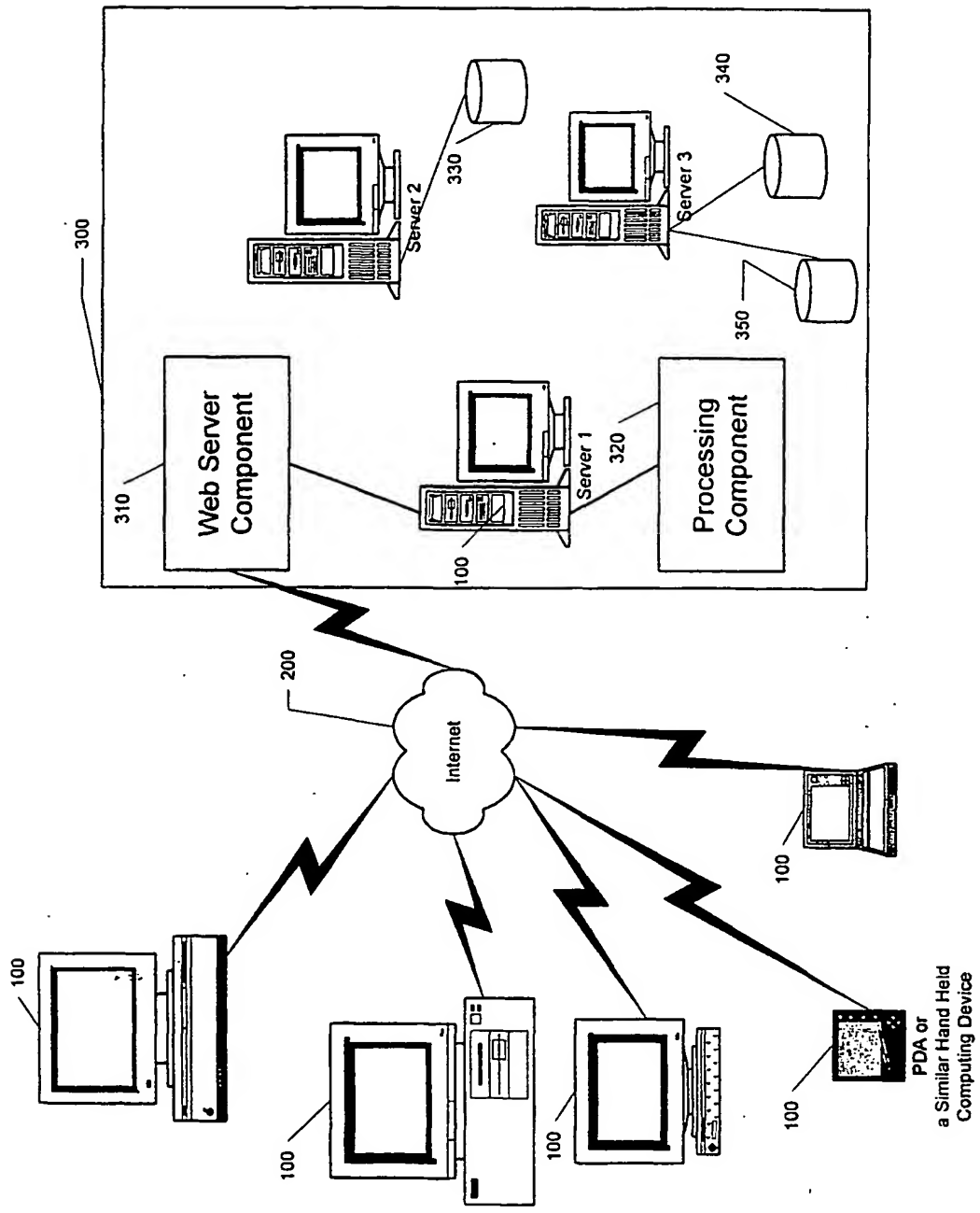

Web Server Component
310
300
Application Server
Processing Component
320
330
340
350
200
Internet
100
100
100

Fig. 4

Fig. 5


300
Server 2
330
Server 3
340
350
Web Server Component
310
Server 1
320
Processing Component
100
200
Internet
100
100
100
100
PDA or a Similar Hand Held Computing Device

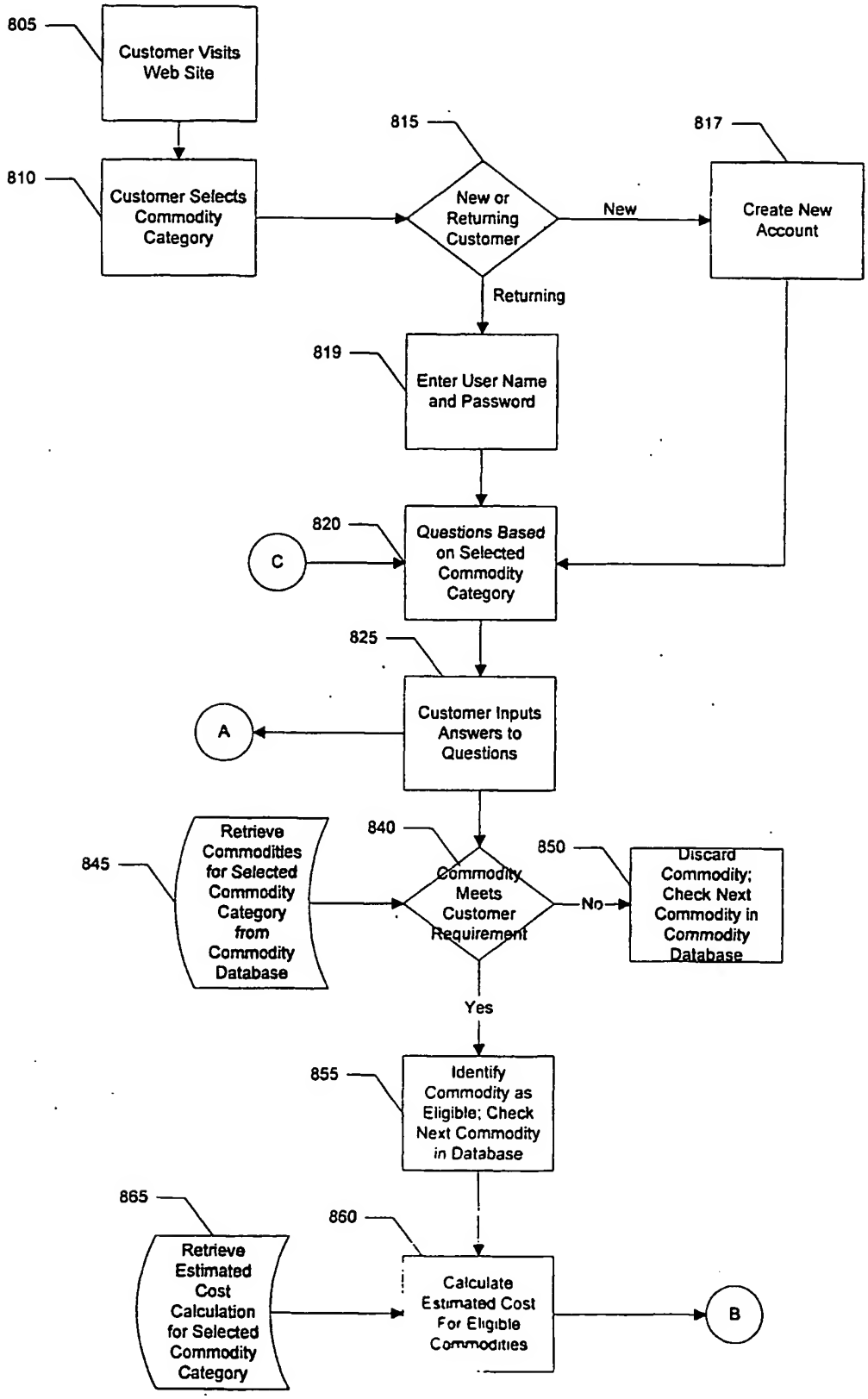
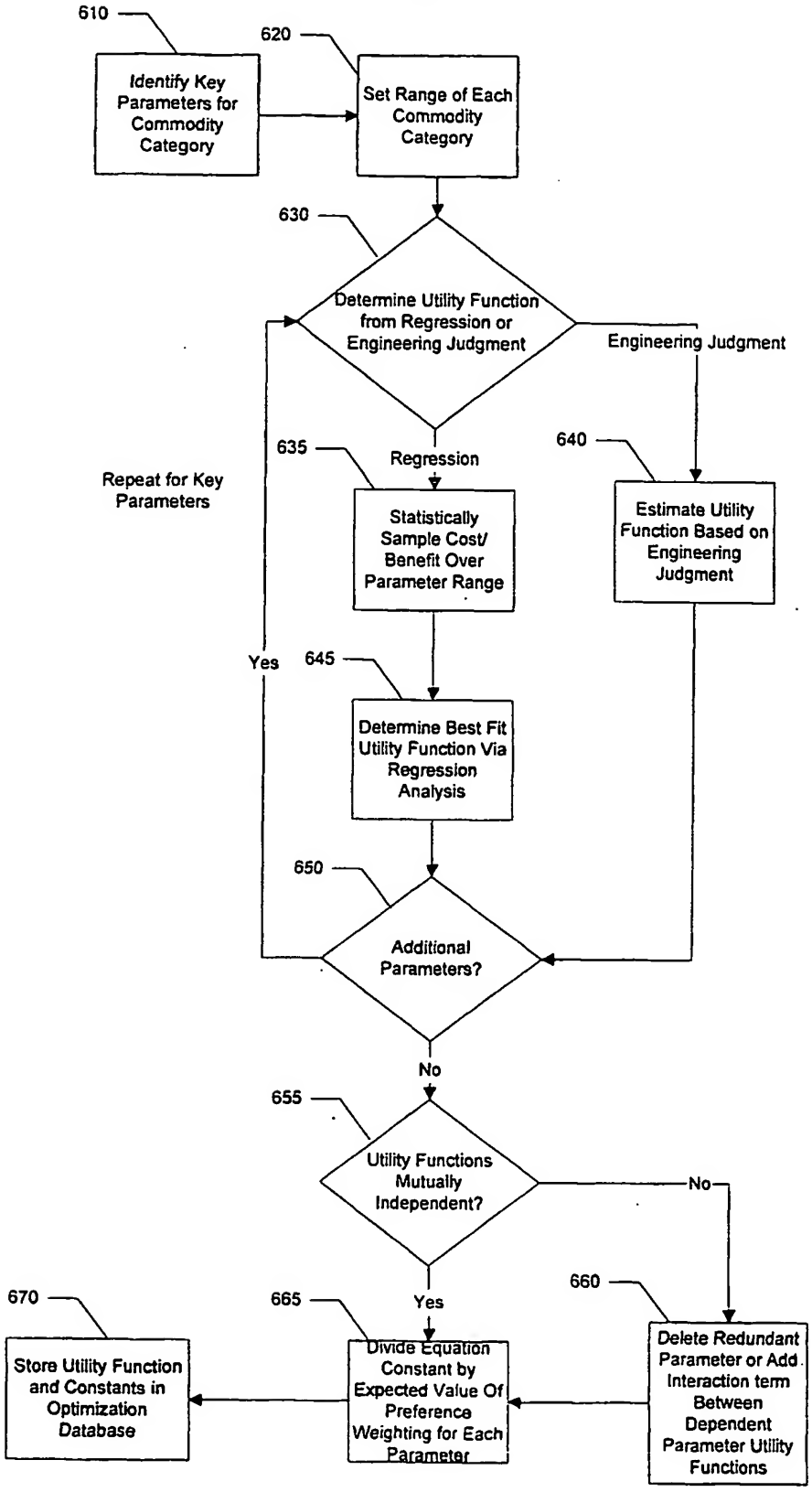

805
Customer Visits Web Site
810
Customer Selects Commodity Category
815
New or Returning Customer
New
817
Create New Account
Returning
819
Enter User Name and Password
820
C
Questions Based on Selected Commodity Category
825
Customer Inputs Answers to Questions
A
845
Retrieve Commodities for Selected Commodity Category from Commodity Database
840
Commodity Meets Customer Requirement
No
850
Discard Commodity; Check Next Commodity in Commodity Database
Yes
855
Identify Commodity as Eligible; Check Next Commodity in Database
865
Retrieve Estimated Cost Calculation for Selected Commodity Category
860
Calculate Estimated Cost For Eligible Commodities
B

Fig. 7


610
Identify Key Parameters for Commodity Category
620
Set Range of Each Commodity Category
630
Determine Utility Function from Regression or Engineering Judgment
Engineering Judgment
Regression
635
Statistically Sample Cost/ Benefit Over Parameter Range
640
Estimate Utility Function Based on Engineering Judgment
Repeat for Key Parameters
Yes
645
Determine Best Fit Utility Function Via Regression Analysis
650
Additional Parameters?
No
655
Utility Functions Mutually Independent?
No
Yes
660
Delete Redundant Parameter or Add Interaction term Between Dependent Parameter Utility Functions
665
Divide Equation Constant by Expected Value Of Preference Weighting for Each Parameter
670
Store Utility Function and Constants in Optimization Database

1) Compared to an ISP (ISP) that ranked average in a national quality survey (where quality represents content, customer service and reliability), how much more or less would you expect to pay ($/month) for a ISP that:
   - ranked in the top 20% nationally ____
   - ranked 10-30% above average nationally ____
   - ranked 10-30% below average nationally ____
   - ranked in the bottom 20% nationally ____

2) Assuming you currently connect to the Internet by dialing up through your phone line (56K Modem), how much more would you be willing to pay ($/month) for a connection that:
   - downloads content from the web 2 time faster ____
   - downloads content from the web 10 times faster ____
   - downloads content from the web 20 times faster ____
   - downloads content from the web 100 time faster ____

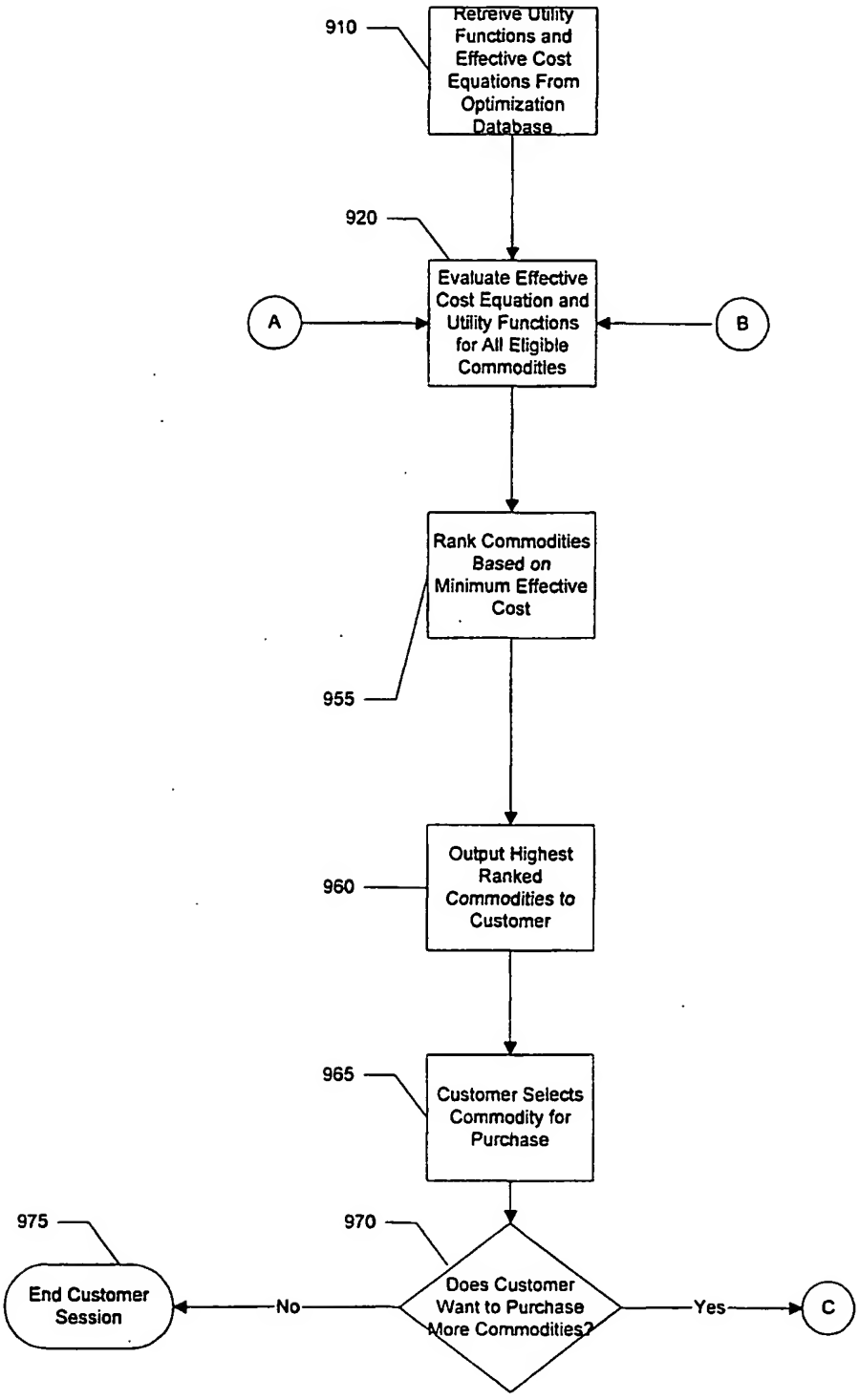
3) How much of this additional premium from 3) would you be willing to pay as a one time up front cost ($ for equipment, installation, activation, etc). for a connection that:
   - downloads content from the web 2 time faster ____
   - downloads content from the web 10 times faster ____
   - downloads content from the web 20 times faster ____
   - downloads content from the web 100 time faster ____

4) Assuming you currently have one email account through your current ISP, how much more would you be willing to pay ($/month) for:
   - 1 additional EMAIL accounts ____
   - 2 additional EMAIL accounts ____
   - 5 additional EMAIL accounts ____
   - 10 additional EMAIL accounts ____

5) Assuming you currently do not have any personal disk storage space (for file storage and personal web-sites) through your current ISP, how much more would you be willing to pay ($/month) for:
   - 1 Mbyte of disk storage space (store 10 content rich web pages, or a video clip) ____
   - 2 Mbytes of disk storage ____
   - 3 Mbytes of disk storage ____
   - 5 Mbytes of disk storage ____
   - 10 Mbytes of disk storage ____

6) Compared to a ISP that required no time commitment for a contract to provide Internet service, how much less ($/month) would you expect to pay for a plan that requires a:
   - 3 month commitment ____
   - 6 month commitment ____
   - 1 year commitment ____
   - 2 year commitment ____

Fig. 9


910
Retreive Utility Functions and Effective Cost Equations From Optimization Database
920
Evaluate Effective Cost Equation and Utility Functions for All Eligible Commodities
A
B
Rank Commodities Based on Minimum Effective Cost
955
Output Highest Ranked Commodities to Customer
960
Customer Selects Commodity for Purchase
965
970
Does Customer Want to Purchase More Commodities?
No
Yes
C
975
End Customer Session

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/03659

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06F 17/60
US CL :705/26

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/26,27; 705/37

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Extra Sheet.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,765,144 A (LARCHE et al.) 09 June 1998; col. 2, line 37 - col. 9, line 20.	1-17
Y	US 5,684,963 A (CLEMENT) 04 November 1997; col. 2, line 64 - col. 4, line 22.	1-17
Y	US 5,794,207 A (WALKER et al.) 11 August 1998; col. 8, line 28 - col. 9, line 5; col. 10, line 18 - col. 11, line 50; col. 15, line 45 - col. 17, line 47; col. 20 line 50 - col. 22, line 38.	1-17
Y,E	US 6,076,080 A (MORSCHECK et al.) 13 June 2000; col. 1, line 34 - col. 23, line 52.	1-17

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search	Date of mailing of the international search report
04 APRIL 2001	27 APR 2001
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer VINCENT MILLIN
Facsimile No. (703) 305-3230	Telephone No. (703) 305-3900

Form PCT/ISA/210 (second sheet) (July 1998) ★

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/03659

B. FIELDS SEARCHED
Electronic data bases consulted (Name of data base and where practicable terms used):

STN; DIALOG
search terms: customer, client, buyer, user, chose, purchase; desire, cost, value, commodity, item, product, service, parameter, characteristic, calculate, cost, value, associate